

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: Brink, et al.	Art Unit: 2627
Serial No.: 10/712,187	Examiner: CAO, Allen T.
Filing Date: 11/12/2003	Confirmation No.: 7903
For: REMELTED MAGNETIC HEAD SUPPORT STRUCTURE IN A DISK DRIVE	Docket No.: 157972-0005

APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

The following appeal brief is submitted pursuant to a Notice of Appeal filed concurrently for the above-identified application.

REAL PARTY IN INTEREST

The real party in interest for the above-identified patent application is Intri-plex Technologies, Inc. (see reel/frame 014704/0500, recorded 11/12/2003).

RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences related to the instant appeal.

STATUS OF CLAIMS

Claims 1-6 are pending. Claims 7-25 have been canceled.

Claims 1-6 stand rejected under 35 USC §103(a), and are hereby appealed.

STATUS OF AMENDMENTS

No amendments have been made after the final Office Action mailed on 04/17/2008.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 claims a magnetic head supporting structure (see e.g. Applicant's specification at Figs. 1-3, and at page 5, line 10 through page 7, line 4, and at page 20, line 13, through page 21, line 3) that has a surface (e.g. surface 30) with fewer than 40 inclusions (see e.g. Figs 5-6) having largest dimension between 0.5 μ m and 2 μ m, per square millimeter (see e.g. Applicant's specification at page 18, lines 3-9).

Independent claim 2 claims a magnetic head supporting structure (see e.g. Applicant's specification at Figs. 1-3, and at page 5, line 10 through page 7, line 4, and at page 20, line 13, through page 21, line 3) that has a surface (e.g. surface 30) with fewer than 40 inclusions (see e.g. Figs 5-6) having hardness 4 or higher on Mohs' Scale and having largest dimension between 0.5 μ m and 2 μ m, per square millimeter (see e.g. Applicant's specification at page 18, lines 3-9, and at page 15 line 11 through page 16 line 6).

GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Pending claims 1-6 stand rejected under 35 USC §103(a) as being allegedly unpatentable over US Patent No. 6,545,842 to Rao et al. (hereinafter "Rao").

There are no other grounds for rejection.

ARGUMENT

I. THE §103(a) REJECTIONS OF CLAIMS 1-2 SHOULD BE WITHDRAWN.

A. Rao does not disclose or suggest material “inclusions.”

Rao does not disclose or suggest material “inclusions,” the hardness of which is of concern in the present patent application (see present patent application, page 15, lines 11-23). On the contrary, Rao discloses “dimples 172” which are concave or hollow indentations (and presumably filled with air rather than any hard particle), and Rao also discloses “shark skin denticles,” which are protrusions that are apparently integral with and of common material with the bulk underlying material. *See* Rao, Figs 1-7. For at least this fundamental lack of teaching material “inclusions” (as recited in pending claims 1-2), Rao does not support a proper *prima facie* case of obviousness of claims 1 or 2. Applicants therefore request that the rejection of claims 1-2 under 35 U.S.C. §103(a) be withdrawn.

In defending the claim rejections, the examiner departs from the consistent usage of the word “inclusions” in the specification, and instead cites extrinsic evidence in the form of a dictionary definition that includes gaseous foreign bodies (see final office action mailed on 17APR2008, page 4).

However, claim 2, for example, expressly rules out the possibility that gaseous or other non-solid foreign bodies can be considered as “inclusions” as the term is used in the presently pending patent application and claims, at least because claim 2 specifies that the inclusions have a “hardness” of 4 or higher on Mohs’ Scale.

Moreover the specification and originally-filed claims consistently use the term “inclusions” in a way that rules out the possibility that gaseous or other non-solid foreign bodies could be included in its definition. Throughout the entire specification, figures, and originally-filed claims, the term “inclusions” refers to solid foreign bodies that can be “released” as “particulate contamination” in a disk drive. Any extrinsic definition of “inclusions” that includes non-solid foreign bodies is simply and clearly inconsistent with the specification and intrinsic record of the pending patent application.

The following table includes 33 exemplary excerpts from the patent specification and claims (as originally filed) that support an interpretation of “inclusions” as solid rather than gaseous or non-solid foreign bodies, and that demonstrate that such an limited interpretation is grounded in the intrinsic record of this case.

Excerpt supporting an interpretation of “inclusion” that is limited to solid foreign bodies (<i>emphasis added</i>).	Pinpoint citation in the pending patent application as originally filed.
“Recognizing that released inclusions can comprise <i>microscopic oxide particles that can later contaminate</i> the head-disk interface and ultimately lead to a head crash, the present inventors fabricated novel head supporting structures using remelted metals.”	Page 11, lines 2-6.
“That is, such deliberate plastic deformation might cause certain material inclusions to be <i>released</i> that cleaning steps would not release.”	Page 10, lines 13-15.
“inclusions having a hardness”	Page 12, line 3.
Figs. 5, 8, and 10 clearly depict solid inclusions.	Figs. 5, 8, and 10.
Figs. 6 and 9 depict material composition of solid inclusions.	Figs. 6 and 9.
“hard inclusion”	Page 13, line 1.
“hard inclusion”	Page 13, line 5.
“FIGURE 10 shows the <i>hard inclusion</i> of FIGURE 8 after a portion of the inclusion was <i>released</i> by plastic deformation due to bending.”	Page 13, lines 6-8.
“The present inventors discovered <i>release</i> mechanisms for inclusions in magnetic recording head support structures and recognized that the range of inclusions that might significantly affect the material properties of bulk metal is different from a range of tribological interest in a disk drive -- different in terms of size, <i>hardness</i> , and quantity.”	Page 14, lines 1-7.
“if such inclusions are <i>released as particles</i> ”	Page 14, line 21.
“if such inclusions are <i>released as particles</i> ”	Page 15, lines 1-2.
“The <i>hardness of an inclusion</i> is of greater concern when considering tribological consequences after <i>release as a particle</i> into the interior environment of a disk drive...”	Page 15, lines 11-13.
“Therefore, certain embodiments of the present invention are focused on a range of <i>inclusion hardness</i> that was not previously considered in the art.”	Page 16, lines 3-6.
“(if those inclusions are <i>released as particles</i> in the interior environment of a disk drive)”	Page 16, lines 8-9.
“(if inclusions are <i>released as particles</i> in the interior environment of a disk drive”	Page 16, lines 16-17.

“metal oxide inclusions”	Page 17, lines 7-8.
“metal oxide inclusions”	Page 17, line 12.
“The inclusions tended to be concentrated in particular areas, and lines or groupings of the particles could often be observed along the rolling direction.”	Page 17, lines 15-17.
“A microscopy image of an example inclusion is shown in FIG. 5. An EDS spectra of the composition of this inclusion is shown in FIG. 6, and indicates high levels of <i>Al, Mg, and O</i> , which mirrors the spectrum of <i>particles</i> identified as being responsible for drive failures.”	Page 17, line 20, to page 18, line 2.
“The oxygen-free atmosphere limits the formation of <i>nonmetallic oxide and nitride inclusions</i> .”	Page 18, lines 13-14.
“ <i>Oxide inclusions</i> ”	Page 19, line 1.
“If the reduction of <i>hard inclusions such as metal oxides</i> is of particular concern ...”	Page 20, lines 7-8.
“... significantly reduced levels of surface inclusions are observed, which in turn reduces post-swage <i>contaminants within the disk drive</i> .” <i>Particulate contamination</i> on disk drive components can be investigated by several methods.”	Page 21, lines 1-5.
“FIG. 8 shows a typical <i>hard inclusion</i> embedded in the surface of a stainless steel swage mount of the type used in the data storage industry as a component of the magnetic head support structure.”	Page 22, lines 1-4.
“The composition of the inclusion is typical for this material, consisting of <i>refractory oxides</i> containing largely aluminum, magnesium, and oxygen.”	Page 22, lines 8-11.
“results in a decreased <i>contact area</i> on the attached inclusion”	Page 23, lines 17-18.
“ <i>inclusion release</i> and consequent tribological problems in the disk drive due to <i>released-particle</i> interaction with the disk surface”	Page 24, lines 3-5.
“inclusions having hardness”	Page 25, originally-filed claim 2.
“inclusions having hardness”	Page 26, originally-filed claim 8.
“inclusions having hardness”	Page 27, originally-filed claim 11.
“inclusions having hardness”	Page 27, originally-filed claim 15.
“inclusions having hardness”	Page 29, originally-filed claim 23.
“hard inclusions”	Page 30, line 7, Abstract.

B. Routine experimentation based on Rao would not lead to the claimed structure.

In the final office action mailed on 04/17/2008, the Examiner stated that although Rao does not disclose the specific structural limitations recited in the claims, it would have been obvious for one skilled in the art to attain the recited structure “through routine lab experimentation and optimization ... to reduce aerodynamic drag forces...”. See 17APR2008 final office Action, page 2. However, it does not logically follow that the structure recited in the pending claims would be attained by an optimization based on the teachings of Rao, because an optimization based on the teachings of Rao would be focused on reducing aerodynamic drag (see Rao col. 7, lines 48-49) rather than being focused on decreasing particulate contamination (see e.g., present patent application, page 14, lines 19-22). Basing claim rejections on an assumption, that the result of an optimization for aerodynamic drag would lead to the same result as a design to reduce particulate contamination, is speculative and doesn’t make “common sense” – which is more relevant than ever under *KSR v. Teleflex*, 127 S. Ct. 1727 (2007).

As the examiner admits in the above quotation from the final Office Action mailed on 04/17/2008, an optimization based on the teachings of Rao would be focused on reducing aerodynamic drag. Indeed, the very same excerpt from Rao that is cited by the examiner for support, in its complete form, also indicates that an optimization based on Rao’s teachings would have aerodynamics as its focus. See Rao col. 7 line 67 to col. 8 line (“Furthermore, the dimples 172 may be *optimized for a particular aerodynamic environment* within different disc drives. That is, both the shape and the size or radius of the dimples 172 may be optimized for different actuator arms 114 and different suspensions 116.” (emphasis added)). Rao provides no motivation for one skilled in the art to undertake routine experimentation or optimization to attain a structure that reduces particulate contamination within the disk drive, and for at least this reason, Rao does not support a proper *prima facie* case of obviousness of claims 1 or 2. Applicants therefore request that the rejection of claims 1-2 under 35 U.S.C. §103(a) be withdrawn.

C. The examiner's modification of Rao is based on the applicant's disclosure.

More generally, and notwithstanding the clear error in the office action's assertion that routine experimentation and/or optimization would lead to the presently claimed structure, Rao provides no motivation whatsoever for one skilled in the art to modify its teachings to create a magnetic head support structure having a surface with fewer than 40 inclusions having the largest dimension between 0.5 μ and 0.2 μ m, per square millimeter, as required by all pending claims. Nor does Rao suggest how one would achieve such a structure. Indeed, improper "hindsight" based on the present application would be required to modify the Rao structure to accomplish a purpose (reducing particulate contamination) that was never contemplated in Rao, via limiting surface inclusions in a way that was never disclosed in Rao (i.e. limiting number of surface inclusions based on their size, as required by pending independent claims 1 and 2). For at least this broader additional reason, Rao does not support a proper *prima facie* case of obviousness of claims 1 or 2. Applicants therefore request that the rejection of claims 1-2 under 35 U.S.C. §103(a) be withdrawn.

In the final office action, the examiner explains that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, which is proper under *In Re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971) so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure. However, in this case the examiner's hindsight reasoning *does* take into account knowledge gleaned only from the applicant's disclosure, without which there would be no basis whatsoever to modify the Rao structure to accomplish a purpose (reducing particulate contamination) that was never contemplated in Rao, via limiting surface inclusions in a way that was never disclosed in Rao (i.e. limiting number of surface inclusions based on their size, as required by pending independent claims 1 and 2). Therefore the examiner's hindsight reasoning is improper under the very same authority that the examiner cites for support. *See id.*

D. Rao teaches away from the claimed invention.

Moreover, Rao can be understood to teach away from the presently claimed limitation on surface inclusions because the pending claims' limitation on inclusions might frustrate Rao's purpose for Rao's "surface features 170." Specifically, Rao discloses "surface features 170" including "dimples 172" which "serve to reduce the overall drag experienced by the suspension 116" (see Rao col. 7, lines 48-49), and "shark skin denticles" 180 "that form small streamwise vortices in the airflow" (see Rao col 8, lines 54-58). Limiting, reducing, or eliminating surface features in compliance with the pending claims could frustrate these stated purposes in Rao, because, for example, if the surface features 170 were too small, few, or absent, such surface features 170 would not appreciably affect aerodynamic drag or flow. Of course there would be no motivation to modify the Rao reference in a way that might frustrate the intended operation of the invention disclosed in the Rao reference. This is clear error and cannot be upheld by the Board. For this additional reason, Rao does not support a proper *prima facie* case of obviousness of claims 1 or 2. Applicants therefore request that the rejection of claims 1-2 under 35 U.S.C. §103(a) be withdrawn.

II. THE §103(a) REJECTIONS OF CLAIMS 3-6 SHOULD BE WITHDRAWN.

A. Claim 3: There is no teaching or suggestion in Rao to use a remelted metal.

Claim 3 is further distinguished from Rao because claim 3 additionally requires a remelted metal. There is absolutely no teaching or suggestion in Rao to use a remelted metal, and utterly no motivation is provided to modify the Rao teachings to include a remelted metal. For this additional reason, Rao can not support a proper *prima facie* case of obviousness of claim 3 (or the claims depending from claim 3), applicants submit that the claims 3-6 are allowable over Rao for this additional reason, and so the rejection of claims 3-6 under 35 U.S.C. §103(a) should be reversed.

B. Claim 4: There is no teaching or suggestion in Rao to use a remelted metal in a swage mount.

Claim 4 is further distinguished from Rao because it additionally requires that the magnetic head support structure component comprises a swage mount. There is absolutely no teaching or suggestion in Rao to use a remelted metal in a swage mount. Indeed Rao does not specify any surface characteristics of a swage mount, remelted or otherwise. The complete absence of this teaching in Rao is not surprising because the characteristics of a swage mount surface would have negligible effect on aerodynamics (the purpose of Rao's surface features – see, e.g., Rao col. 7, lines 2-6). In contrast, the surface of the swage mount takes on importance only with improper hindsight consideration of the disclosure of the present patent application which discloses that plastic deformation of the swage mount during swaging can exacerbate particulate contamination. See present patent application, page 10, lines 7-16. For this additional reason, Rao can not support a proper *prima facie* case of obviousness of claim 4 and Applicants submit that claim 4 is allowable over Rao for this additional reason.

C. Claim 5: There is no teaching or suggestion in Rao that a remelted metal be used in a magnetic head suspension spring.

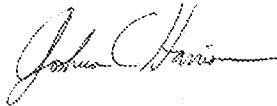
Claim 5 is further distinguished from Rao because it additionally requires that the magnetic head support structure component comprises a magnetic head suspension spring. There is absolutely no teaching or suggestion in Rao that a remelted metal be used in a magnetic head suspension spring. Rather, a desire for material purity at the surface of a magnetic head suspension spring takes on importance only with improper hindsight consideration of the disclosure of the present patent application which discloses that plastic deformation of the “bend area” of a magnetic head suspension spring (to provide a pre-load force) can exacerbate particulate contamination. See present patent application, page 10, lines 13-21. For this additional reason, Rao can not support a proper *prima facie* case of obviousness of claim 5 and Applicants request

that the rejection of claim 5 under 35 U.S.C. §103(a) should be withdrawn for this additional reason.

CONCLUSION

Reversal of the final claim rejections is respectfully requested. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment to Deposit Account No. 50-4119.

Respectfully submitted,

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Date: 17 June 2008

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CLAIMS APPENDIX

A complete listing of the claims on appeal:

1. (Original) A magnetic head supporting structure, comprising:

a magnetic head support structure component having a surface with fewer than 40 inclusions having largest dimension between 0.5 μm and 2 μm , per square millimeter.

2. (Original) A magnetic head supporting structure comprising:

a magnetic head support structure component having a surface with fewer than 40 inclusions having hardness 4 or higher on Mohs' Scale and having largest dimension between 0.5 μm and 2 μm , per square millimeter.

3. (Previously presented) The magnetic head supporting structure of claim 1

wherein the magnetic head support structure component comprises remelted metal.

4. (Previously presented) The magnetic head supporting structure of claim 3 wherein
the magnetic head support structure component comprises a swage mount.

5. (Previously presented) The magnetic head supporting structure of claim 3 wherein the magnetic head support structure component comprises a magnetic head suspension spring.

6. (Previously presented) The magnetic head supporting structure of claim 3 wherein the magnetic head support structure component comprises a magnetic head actuator arm.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.